

Group 3 Final Presentation

Submitted by

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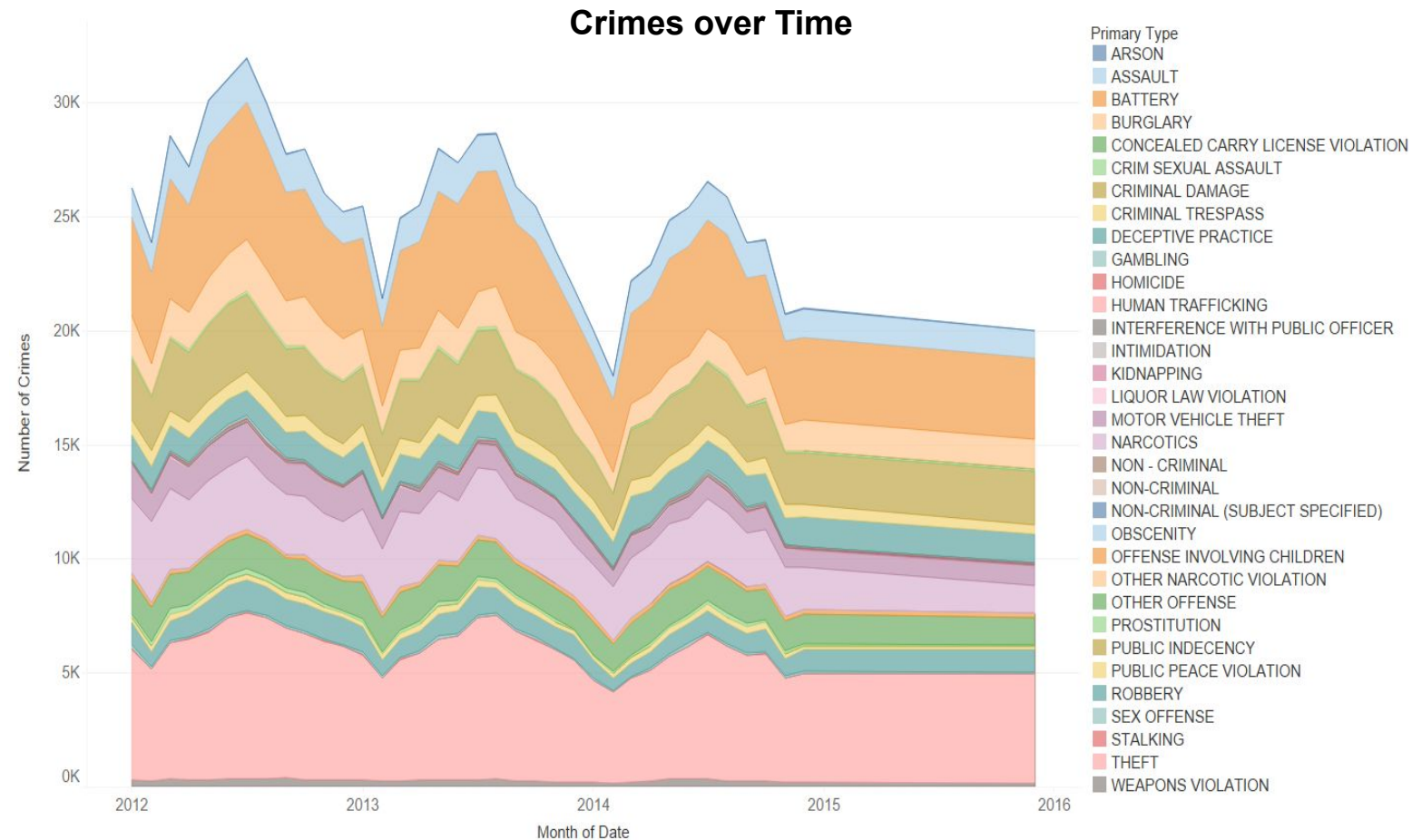
Crime Rate in Chicago

Background

Chicago has faced high crime rates where, on average, there are **more than 20,000 crimes each month**. Over the past several years, the main types of crime have included theft, battery, and narcotics.

Crimes by Type Over Time

- This chart shows the number of crimes committed by type across a four year timeline from 2012 to 2016
- Looking at the results you'll notice the amount of crimes committed dip every year in the winter
- Overall crimes have been decreasing year over year, although the city of Chicago is looking for ways to further decrease the crime rate



Education's Impact on Crime

Business Problem

Business Problem

- The quality of the education system in Chicago is believed to correlate to the high crime rate in Chicago
- The following metrics will be evaluated to determine the relationship between education and crime:
 - Drop-out Rates
 - Student Growth Percentile
 - Student Attainment Percentile
 - Attendance Rates
 - College Enrollment
 - Demographic Information

Main Objective: Using the data outlined above, our team will identify the key education metrics to reduce the crime rate by 25% over 3 years

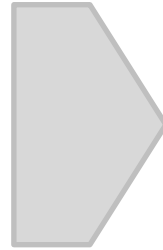
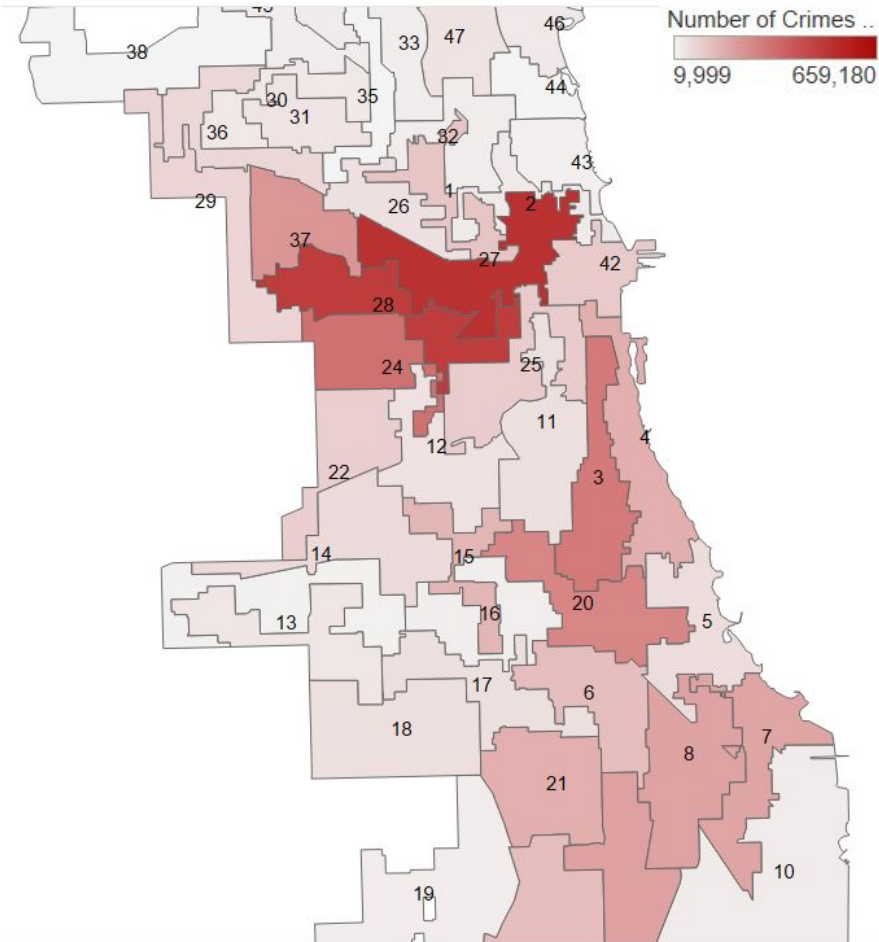
Data Sources & Key Assumptions

- Crime Data:
 - <https://data.cityofchicago.org/browse?category=Public+Safety&page=1>
- Location: All the crimes data was aggregated from the following sources: Crimes - 2012, Crimes - 2013, Crimes - 2014, Crimes - 2015
- Education Metrics: **[file name(s)]**
 - High School 2012 Student Attainment Percentile: The percentile information was missing, so we used the attainment ratings to assign an attainment percentile. The rating to percentile conversion was based off the average percentile for each rating in the 2012-2013 Elementary School data.
- Location: CPS School Locations SY1617
 - For any missing ward information, used <https://cps.edu/ScriptLibrary/Map-SchoolLocator/index.html>

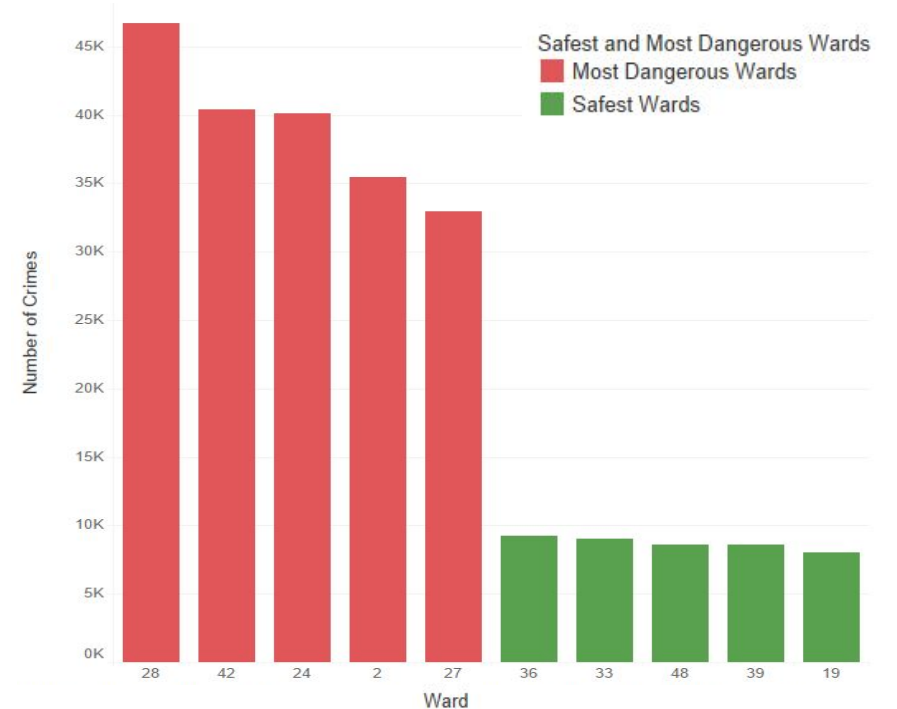
Safest and Most Dangerous Wards

Analysis

Heatmap: Crime by Ward



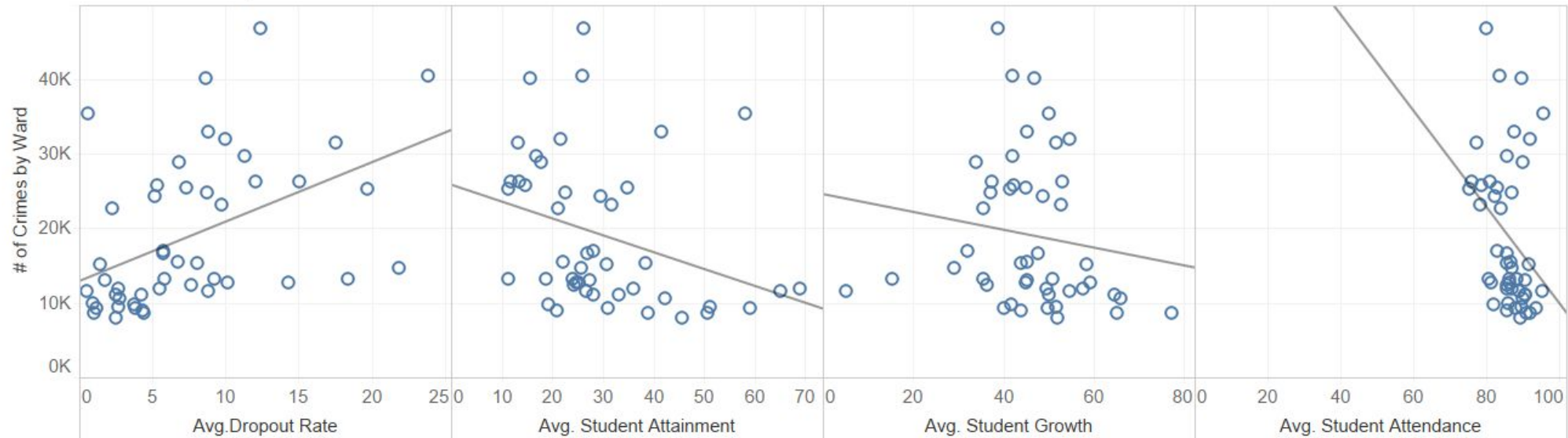
Safest & Most Dangerous Wards



The safest and most dangerous wards were selected from the heatmap of all the wards by calculating the total number of cases that occurred from 2012 - 2015 by ward. There is less variance in the crime rate for the 5 safest wards.

Key Education Metrics Analysis

Crime Rate vs Key Education Metrics - All Wards

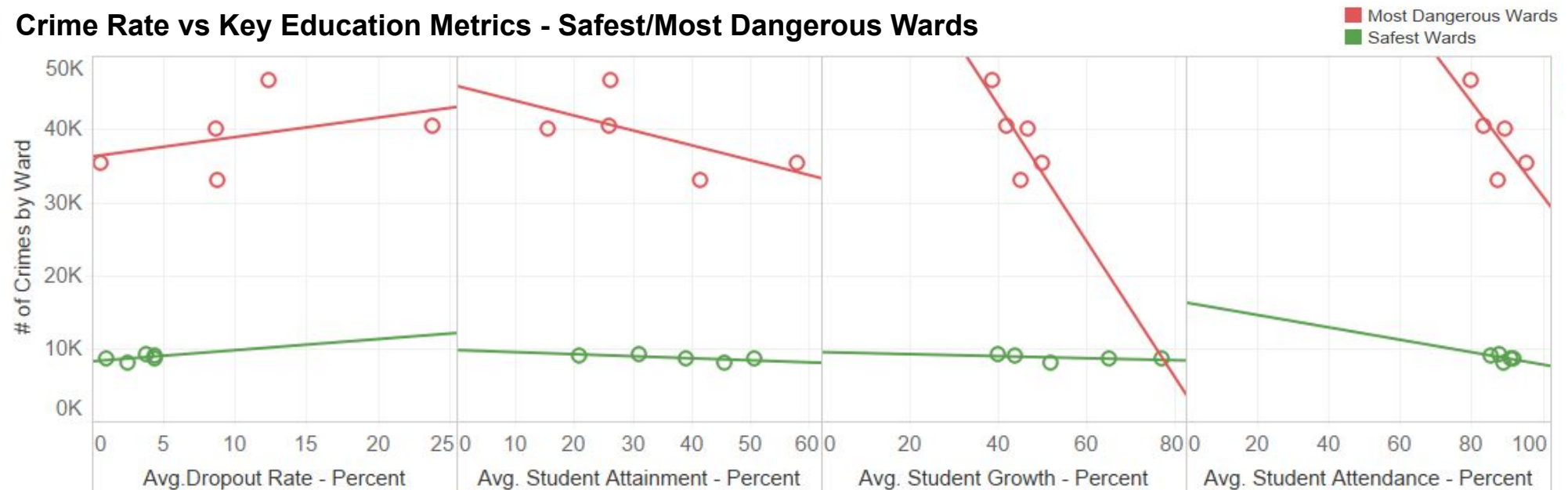


R-Value	0.4621	-0.3211	-0.1473	-0.3140
P-Value	0.0011	0.0296	0.3285	0.0316

Key Findings: Based on the comparison of the crime rate and four key education metrics, the **average dropout rate has the strongest correlation** to the crime rate. However, the strength of the correlation is only moderate. The low p-value means there is a high confidence in the relationship.

Key Education Metrics – by Safest and Most Dangerous Wards Analysis

Crime Rate vs Key Education Metrics - Safest/Most Dangerous Wards

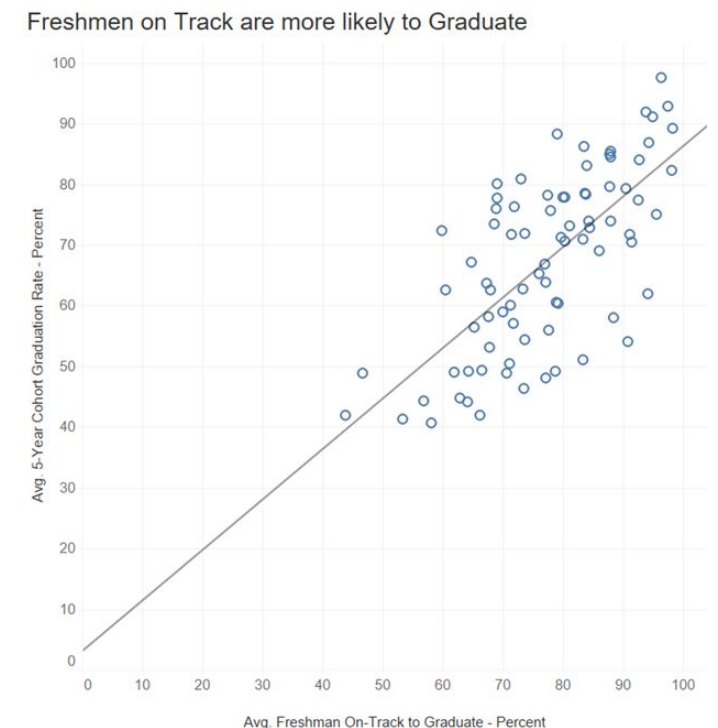
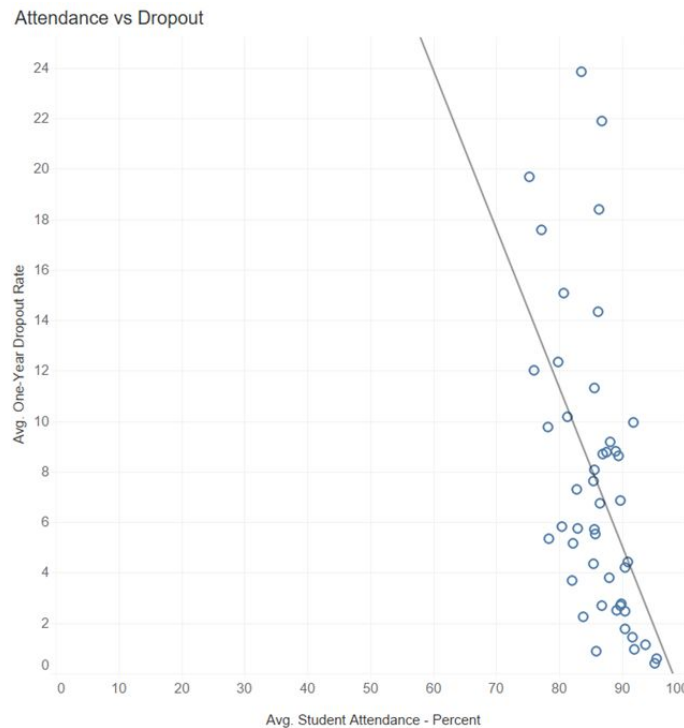
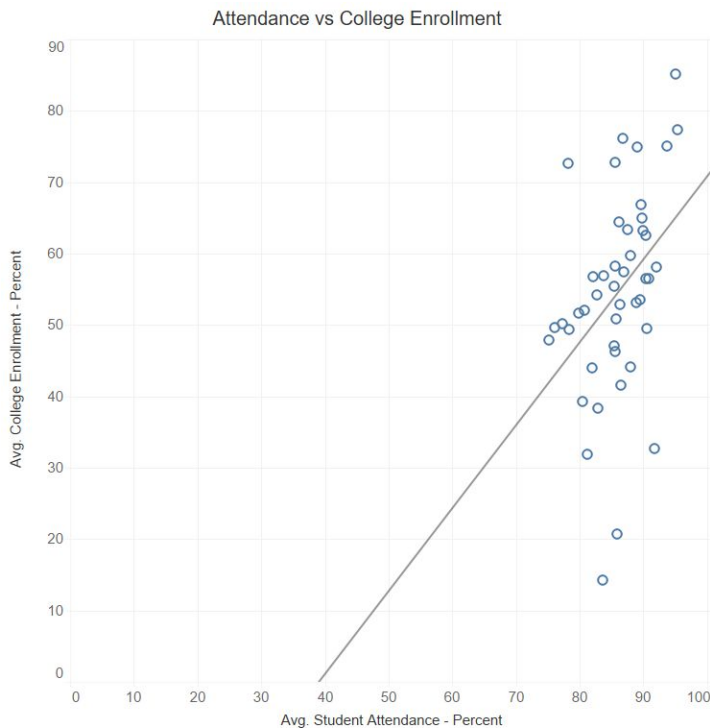


Safest Wards	R-Value	0.4857	-0.7220	-0.4652	-0.4729
	P-Value	0.4069	0.1684	0.4300	0.4212
Most Dangerous Wards	R-Value	0.4244	-0.6362	-0.7552	-0.7187
	P-Value	0.4763	0.2468	0.1400	0.1714

Key Findings: By comparing the same metrics for the safest and most dangerous wards, there are more significant correlations. A ward will have **increased similarities within its group**, and the most dangerous wards are more affected by education metrics. Due to smaller sample size, the confidence is lower. To improve the crime rate, the **most significant education metrics are student growth and student attendance** for the most dangerous wards.

Key Education Metrics – Correlation between Education Metrics Analysis

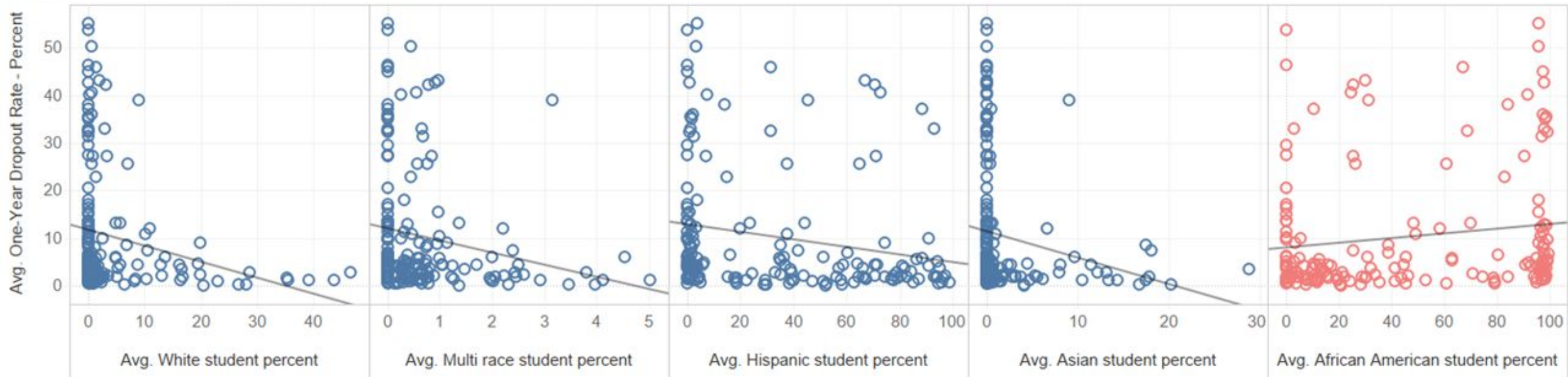
Relationship between Education Metrics



Key Findings: Attendance is also correlated to college enrollment and the dropout rate. Therefore, **attendance should be the key factor** changed due to its correlation to the crime rate, college enrollment, and dropout rate

Other Factors to Consider Analysis

Drop Crime Rate vs Key Education Metrics - All Wards



Key Findings: Schools with a **high percentage of African American students are more likely to have higher dropout rates**. Therefore, it is important to motivate this specific group of students to stay in school as there was shown to be a correlation between the dropout rate and the crime rate.

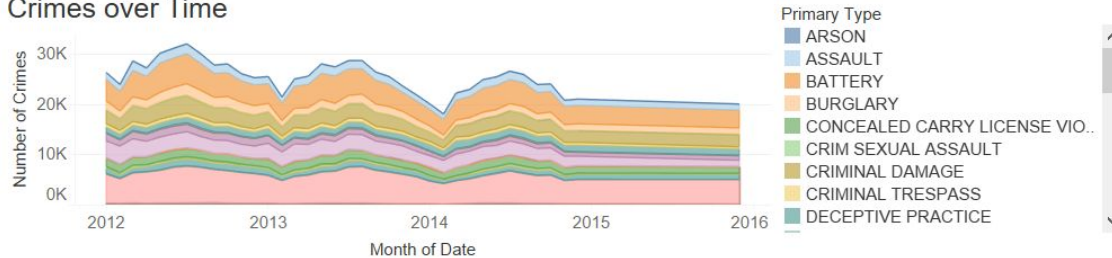
Dashboards for Key Stakeholders

Mayor, Deputy Mayor, City's Chief of Public Policy and City's Chief Data Officer

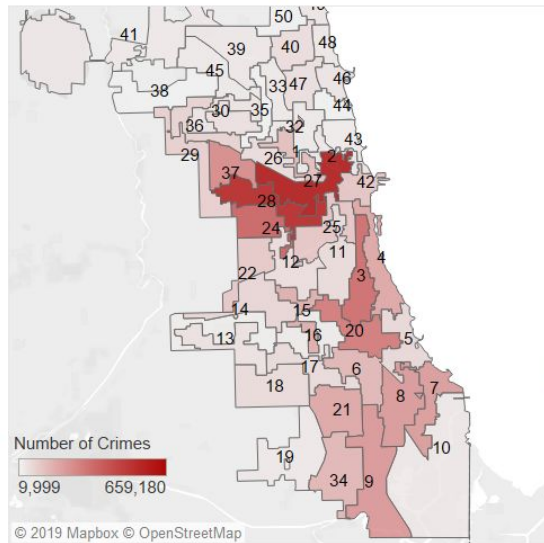
Trends in Chicago Crime by Ward

Year
2012

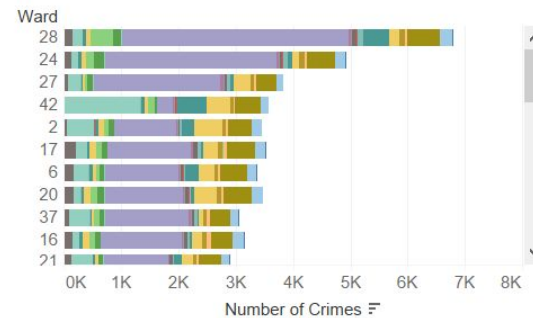
Crimes over Time



Heatmap: Crime by Ward



Crime Type per Ward - 2012

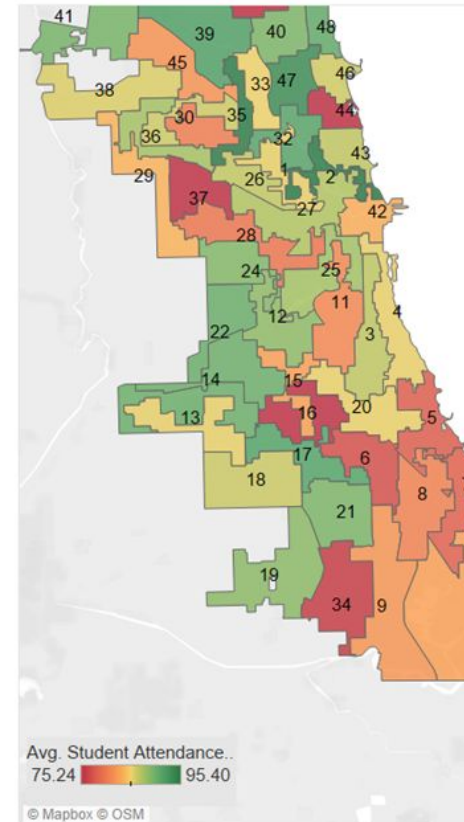


Safest, Least Safe Wards



Key Education Metrics by Ward

Map of Student Attendance



Dropout Rate by Ward



Attainment by Ward



Dropout by Demographic

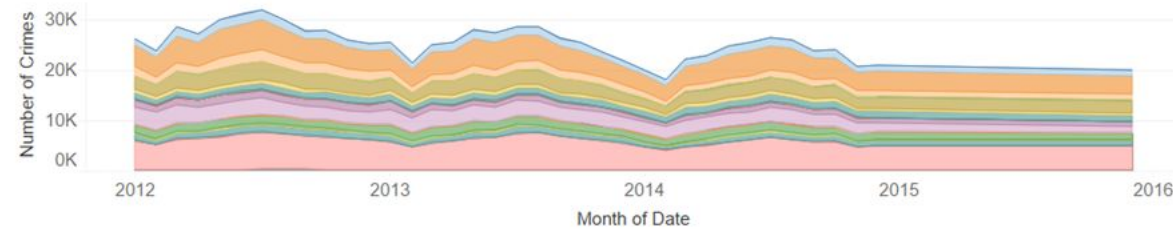


Dashboards for Key Stakeholders

Chief of Police

Crime over Time

Crimes over Time



Primary Type

- ARSON
- ASSAULT
- BATTERY
- BURGLARY
- CONCEALED CARRY LI.
- CRIM SEXUAL ASSAULT
- CRIMINAL DAMAGE
- CRIMINAL TRESPASS
- DECEPTIVE PRACTIC
- GAMBLING

Top Crimes by Month (2012-2016)

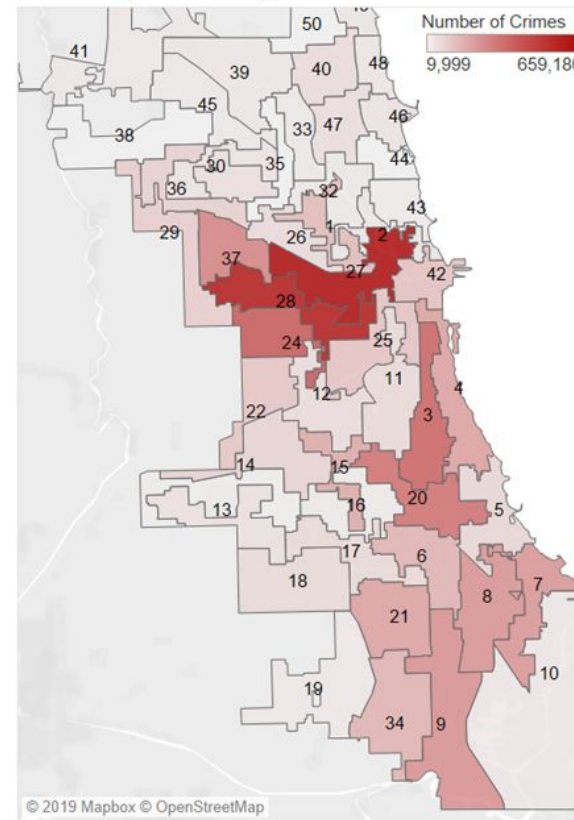


Number of Crimes Committed by Type

Primary Type	2012	2013	2014	2015
THEFT	75,461	71,530	61,564	4,795
BATTERY	59,136	54,003	49,447	3,528
NARCOTICS	35,488	34,127	29,118	1,203
CRIMINAL DAMAGE	35,854	30,853	27,798	2,367
ASSAULT	19,898	17,972	16,902	1,190
OTHER OFFENSE	17,481	17,994	16,982	1,214
BURGLARY	22,842	17,894	14,569	1,304
DECEPTIVE PRACTI..	13,665	13,766	15,751	1,249
MOTOR VEHICLE TH..	16,492	12,582	9,912	873
ROBBERY	13,485	11,820	9,799	998
CRIMINAL TRESPASS	8,216	8,136	7,539	419
WEAPONS VIOLATION	3,907	3,246	3,114	161
PUBLIC PEACE VIOL..	3,007	3,135	2,903	141
OFFENSE INVOLVIN..	2,228	2,386	2,412	167
PROSTITUTION	2,204	1,652	1,625	62
INTERFERENCE WIT..	1,228	1,281	1,399	63

Crime by Ward

Heatmap: Crime by Ward



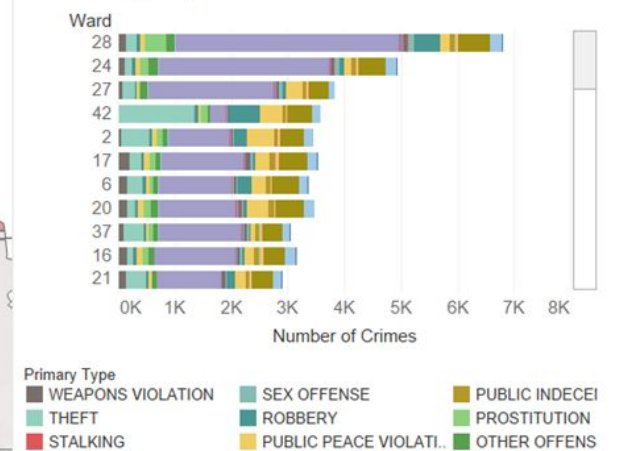
Safest, Least Safe Wards



Most Outstanding Crimes (Ward)



Crime Type per Ward - 2012

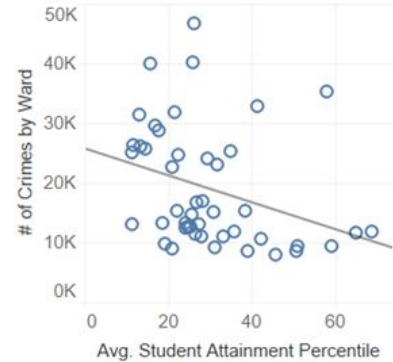


Dashboards for Key Stakeholders

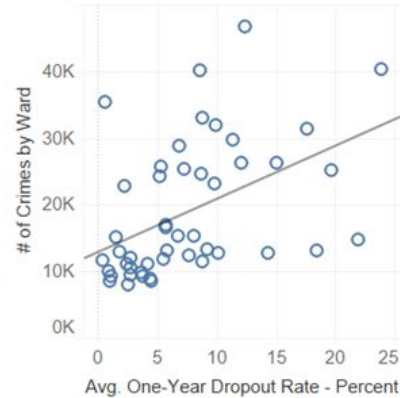
CEO of Chicago Public Schools

Main Educational Factors Affecting Crime

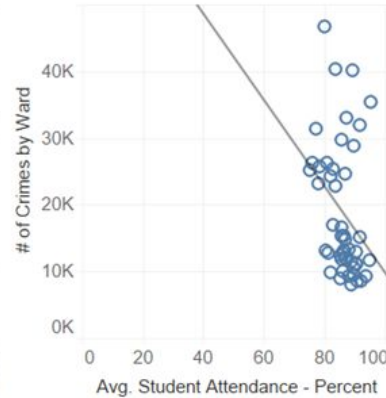
Student Attainment vs Crime Rate



Dropout Rate vs Crime Rate

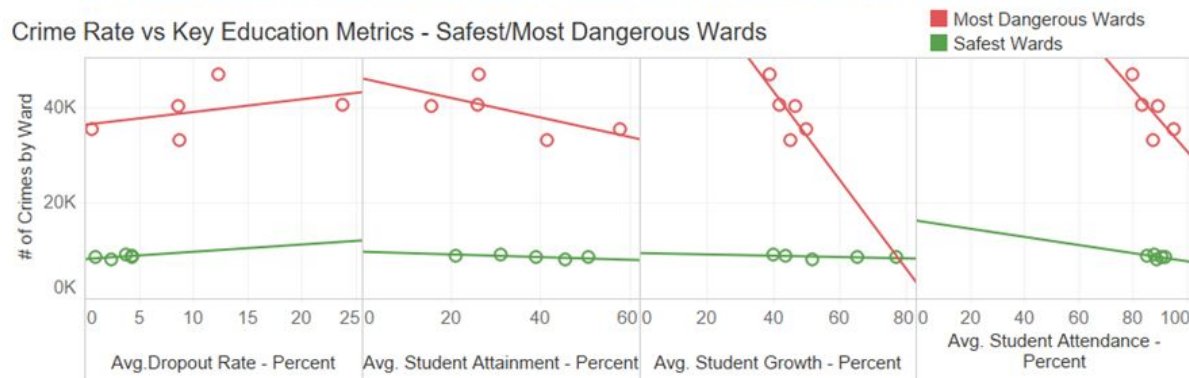


Attendance vs Crime Rate



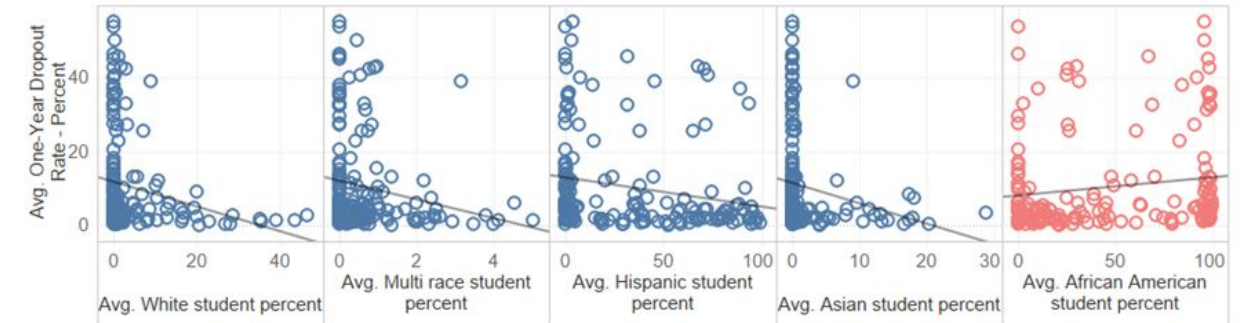
Educational Factors Influence Not as Pronounced for Safer Wards

Crime Rate vs Key Education Metrics - Safest/Most Dangerous Wards



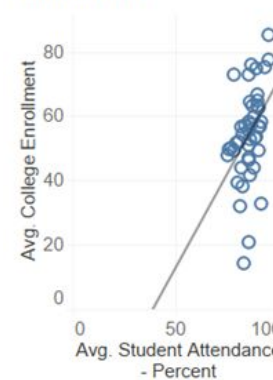
Focus Efforts on African American Communities

Dropout Rate by Demographic

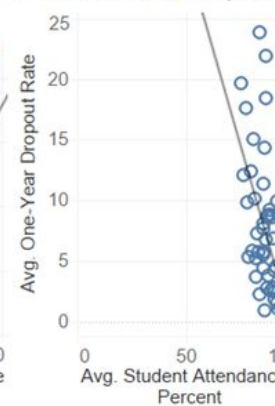


Leverage Educational Variables' Interconnectedness

Attendance vs College Enrollment



Attendance vs Dropout



School Safety Correlated w/Graduation



Recommendations & Summary

Key Takeaways

Improve the Student Attendance Rates

- Increasing the student attendance rates should have a negative relationship with the crime rate
- Increased student attendance will correlate with higher college enrollment and lower dropout rates

Focus on African-American Dropout Rates

- African-American students are more likely to dropout than other races
- There should be specific efforts made to decrease the dropout rates for these students

Utilize Improved Data Tracking

- The dashboards should be used to track key metrics and drive decision making
- Dashboards were created by audience to best fit the reporting needs of the specific audience

By utilizing these three recommendations, the quality and performance of the Chicago Public Schools will improve and will correlate to a decrease in the crime rate.